REMARKS

Status of the Claims

Claims 1, 3-16, and 21-45 are pending in the present application, Claims 2 and 18 having been canceled in preliminary amendments, Claims 17, 19, and 20 having been cancelled in the present amendment as being directed to a non-elected invention in response to a Restriction Requirement (subject to applicants' right to file a copending divisional application), and new Claims 29-45 having been added in the present amendment. Claims 1, 3-16, and 21-28 have been amended to more clearly define the invention and to correct minor typographical errors.

Election with Traverse

On March 16, 2006, during a Telephone Restriction made by the Examiner, applicants' current attorney (Michael King, Reg. No. 44,832) provisionally elected the invention defined by the claims in Group I (i.e., Claims 1, 3-7 and 21-24), with traverse. Applicants hereby affirm the election of Claims 1, 3-7, and 21-24, in response to the Restriction. The claims in Group III (Claims, 17, 19, and 20) have been canceled, and that portion of the Restriction is not being traversed.

However, applicants hereby traverse the Restriction of the application, which the Examiner restricted based on a combination and subcombination relationship between the claims in Groups I and II. The reasons why applicants respectfully believe that the Examiner erred in making the Restriction are as follows.

MPEP 806.05(a) defines a combination as an organization of which a subcombination or element is a part. MPEP 806.05(c) specifically notes (in part) that inventions are distinct if it can be shown that a combination as claimed *does not require the particulars of the subcombination as claimed for patentability*.

With respect to inventions defined by the claims in Groups I and II, the Examiner has identified the claims of Group I as a subcombination, and the claims of Group II as the combination.

The claims in Group I recite a regenerable collection surface, a surface regenerator (a newly added element), and a biological detector. Significantly, the term "biological detector" is broadly defined. Thus, the subcombination (a regenerable collection surface, a surface regenerator, and a biological detector) can be viewed as a set of elements, $\boldsymbol{B}_{br}$. Following the convention used in the MPEP, the subscript "br" is an abbreviation for broad, while the subscript "sp" an abbreviation for specific. With respect to the subcombination, the set of elements $\boldsymbol{B}$ is intended to include a regenerable collection surface, a surface regenerator, and a biological detector. The subcombination is clearly broad, because the biological detector

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can be implemented by many different types of detectors, including a fluorescence detector, a Raman spectrometer, a Fourier transform infrared spectrometer, or a MALDI mass spectrometer fluorescence detector (as indicated by the recitation of Claim 5).

The claims of Group II recite a regenerable collection surface, a surface regenerator, a biological detector that is a fluorescence detector, and a light source. Thus, the claims identified as a combination can be viewed as a set of elements $\boldsymbol{AB_{sp}}$, with $\boldsymbol{A}$ corresponding to the light source and $\boldsymbol{B}$ corresponding to the regenerable collection surface, the surface regenerator, and the biological detector (which in this case, *must be* a fluorescence detector, since the light source is provided specifically for that type of biological detector). Note that because the biological detector is narrowly defined as a specific type of biological detector, the *sp* subscript is appropriate for this group of claims.

The combination and subcombination relationship can therefore be diagrammed as $\boldsymbol{AB_{sp}/B_{br}}$. Significantly, such a diagram does not correspond to any of examples I, II, or III in MPEP 806.05(c). Note that if the subcombination was specifically defined, but the combination were broadly defined (i.e., if the relationship between the two groups of claims could be diagrammed as $\boldsymbol{AB_{br}/B_{sp}}$), restriction would be proper because both the subcombination and combination are assumed to be patentable, and the omission of details in the claimed subcombination in the combination claim is evidence that the patentability of the combination does not rely on the details of the specific subcombination. However, such a circumstance does not exist in the context of the present combination and subcombination relationship.

Assuming that the present subcombination $\boldsymbol{B_{br}}$ and combination $\boldsymbol{AB_{sp}}$ are patentable, it simply cannot be said the combination does not require the particulars of the subcombination for patentability. In other words, where a broadly recited subcombination is patentable (i.e., $\boldsymbol{B_{br}}$), then all more narrowly defined combinations must also be patentable, and the combination relies on elements recited in the subcombination for patentability. In terms of the claims of Groups I and II in the present application, if the invention defined by the claims in Group I (the subcombination comprising *a regenerable collection surface, a surface regenerator, and a broadly defined biological detector*) is assumed to be patentable, then the invention defined by the claims of Group II (the combination comprising *a regenerable collection surface, a surface regenerator, and a* ***narrowly defined*** *biological detector* in combination with some additional element) clearly relies on the details of the subcombination for patentability (i.e., the combination omits no elements required for patentability of the subcombination). MPEP 806.05(c) makes it clear that a restriction based on a combination and subcombination is only proper when the opposite is true. Accordingly, there is no basis

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for restricting the claims of Groups I and II, and therefore the claims corresponding to the inventions defined by the claims of Groups I and II should be examined together. Applicants therefore request the Examiner to withdraw the Restriction.

Claims Rejected under 35 U.S.C § 102

The Examiner has rejected Claim 1 under 35 U.S.C § 102(b) as being anticipated by Goldstein (U.S. Patent No. 5,063,164). The Examiner asserts that Goldstein discloses a substrate containing a self-regenerating chemical sensor reagent that responds to airborne toxins interacting with the substrate, and an optical detector that detects the response of the self-regenerating chemical sensor reagent to the airborne toxins. This rejection is not applicable to the claim as amended for the following reasons.

Applicants have significantly amended each independent claim to recite a surface regenerator that physically removes particles previously deposited on the collection surface. In contrast, Goldstein discloses a chemical sensor configured to detect airborne toxins such as carbon monoxide, mercury, ethylene oxide, volatile organic materials, and hydrogen sulfide. Such materials are not particles that can be deposited upon a collection surface (they are gaseous or vaporous materials that can be absorbed into the porous substrate used by Goldstein for interaction with a reagent that selectively binds the airborne vapors). Goldstein does not teach or suggest a surface regenerator or any equivalent that physically removes particles previously deposited upon a collection surface. Goldstein's chemical sensor regenerates because the internal pores of Goldstein's porous substrate are coated with a chemical reagent that selectively binds with one or more of the above identified toxins. The binding is reversible, which enables regeneration of the substrate. After a toxin has become attached to the chemical reagent, the toxin will be released from the chemical reagent over time, if the chemical reagent is exposed to ambient conditions where the concentration of the toxin is relatively low (i.e., lower than the concentration of the toxin bound to the reagent). This natural disassociation process that Goldstein uses to regenerate the substrate, whereby a gaseous material is chemically attached to a reagent and released over time, is distinctly different than using a physical structure (i.e., a surface regenerator) that physically removes solid particles from a collection surface.

It should also be recognized that Claim 1 specifically recites a detector configured to detect a biological signature. The specification as filed specifically defines a biological signature using the following language: *Any known property inherent to biological particles or to specific subsets of*

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biological particles may be subject to analysis. There are many examples of such properties, sometimes called biological signatures, and they may be detected by optical or non-optical methods. The specific materials disclosed by Goldstein may be toxic to biological organisms and biological cells, but those materials do not exhibit a *biological signature.* In other words, the sensor recited in Claim 1 must be capable of detecting biological particles. Goldstein merely discloses a sensor capable of detecting toxins that can detrimentally affect a biological organism. Such sensors are not equivalent to applicants' recited sensor, and Claim 1 distinguishes over Goldstein for this additional reason.

Furthermore, because Goldstein does not teach or suggest depositing solid particles on a collection surface, there would be no motivation to incorporate a physical structure (i.e., a surface regenerator) adapted to remove particles deposited upon the collection surface, to regenerate the collection surface. Such a surface regenerator would be entirely unnecessary in the technique disclosed by Goldstein. Independent Claim 1 (as well as independent Claims 8, 21, and 25) therefore distinguishes over Goldstein. Accordingly, the rejection of Claim 1 as being anticipated by Goldstein should be withdrawn.

Claims Rejected under 35 U.S.C § 103

The Examiner has rejected Claims 3, 4, 5-7, 21, 22, 23, and 24 under 35 U.S.C § 103(a) as being obvious over Goldstein, in view of various other prior art references. As noted above, applicants have significantly amended the claims, and as amended, the claims distinguish over the cited art for the following reasons.

Claim 3 has been amended to recite "*a spotting nozzle configured to direct an air stream towards the regenerable collection surface, such that a resulting impact of the air stream with the regenerable collection surface produces a spot of particles on the regenerable collection surface.*" In contrast, Goldstein discloses that chemical vapors penetrate a porous substrate to react with a reactant deposited on internal portions of the porous substrate. Given such disclosure, an artisan of ordinary skill would not have been motivated to modify Goldstein to include a spotting nozzle configured to generate a spot of particles on the collection surface. Accordingly, the rejection of Claim 3 as being obvious over Goldstein in view of additional art should be withdrawn.

With respect to Claim 4, the Examiner argues that Tsai (U.S. Patent No. 5,553,795) discloses an impaction plate, and that it would have been obvious to modify Goldstein to incorporate such

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impaction plate to facilitate collection of particles. Such an argument fails to recognize that Goldstein does not collect particles. Goldstein discloses a reagent deposited on internal surfaces in a porous substrate, and teaches exposing the porous substrate to airborne vapors, not airborne particles. Thus, there would have been no reason to include an impaction plate in Goldstein's device, because such a modification would fundamentally change the operation of Goldstein's device (i.e., from a vapor detector to a particle detector – which is outside the technology contemplated by Goldstein). Further, it must be recognized that Claim 4 depends on Claim 1, which is distinguishable over the cited art for the reasons discussed above. Accordingly, the rejection of Claim 4 as being obvious over Goldstein in view of additional art should be withdrawn.

Claims 5-7, 21, and 23-24 have each been rejected as being obvious over Goldstein in view of Selinfreund, which discloses a fluorescence detector. The Examiner appears to argue that it would have been obvious to incorporate a fluorescence detector into Goldstein's device. However, such a detector would not function in Goldstein's device, because as discussed in detail above, Goldstein's device does not (and is not readily modified) to collect particles. Therefore, there appears to be no reasonable motivation for an artisan of ordinary skill to attempt to incorporate a fluorescence detector into Goldstein's device. Accordingly, the rejection of Claims 5-7, 21, and 23-24 as being obvious over Goldstein in view of additional art should be withdrawn.

With respect to Claims 5-7, independent Claim 1 specifically defines a surface regenerator configured to remove particles that were previously deposited upon the collection surface. Such a surface regenerator is distinctly different than the regenerable reagent disclosed by Goldstein. Claims 5-7, which ultimately depend on Claim 1, are thus distinguishable over the cited art for this additional recent.

Claim 21 specifically recites "*depositing airborne particles on a regenerable collection surface provided for supporting a spot of immobilized airborne particles.*" As discussed in detail above, Goldstein does not teach or suggest depositing spots of particles. Claim 21 also recites *measuring a biological signature.* Goldstein's reagent binds to toxins, not biological particles, and Goldstein does not teach or suggest measuring a biological signature. Claim 21 additionally recites "*determining a concentration of the immobilized airborne biological particles*." Goldstein discloses determining a concentration of airborne toxic vapors, which is not equivalent. Finally, Claim 21 recites "*regenerating the regenerable collection surface by removing particles from the regenerable collection surface, such that once thus regenerated, the regenerable collection surface can collect additional particles*

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from the air, and such that particles collected before a regeneration of the regenerable surface are substantially no longer present to contaminate particles collected after the regeneration." As discussed in detail above, Goldstein does not regenerate a collection surface by physically removing particles. Claim 21, and each claim dependent thereon, distinguishes over the cited art for these additional reasons, and are therefore patentable. Specifically, Claims 22 - 24 ultimately depend from Claim 21 and thus, distinguish over the cited art for the reasons noted above.

Patentability of Newly Added Claims

Applicants have added new Claims 29-39 in the present amendment, each of which are fully supported by applicants' disclosure.

New Claim 29 depends from Claim 1, and specifically recites "*a dichroic mirror that substantially reflects the excitatory radiation and is substantially transparent to the fluorescence radiation emitted by the excited biomolecules, the dichroic mirror being positioned to reflect the excitatory radiation towards the particles deposited upon the regenerable collection surface.*" The cited art does not teach or suggest such a configuration.

New Claim 30 depends from Claim 1, and specifically provides that at least one of an *excitation filter* and an *emission filter* is disposed adjacent to the dichroic mirror. The cited art does not teach or suggest such a configuration. FIGURE 5 and the related text on page 11, paragraph [0109] of the published patent application disclose such details.

New Claim 31 depends from Claim 1, and specifically defines the surface regenerator as comprising at least one of:

(a) a brush that regenerates the regenerable collection surface by brushing away particles that were collected on the regenerable collection surface;

(b) a pad that regenerates the regenerable collection surface by pressing against the regenerable collection surface while the pad and the regenerable collection surface move relative to each other, so as to remove particles that were collected on the regenerable collection surface; and

(c) a wheel coupled to a motor that regenerates the regenerable collection surface by pressing against the regenerable collection surface while the motor rotates the wheel, so as to remove particles that were collected on the regenerable collection surface.

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The cited art does not teach or suggest an equivalent. FIGURE 2 and the related text on page 7, paragraphs [0068]-[0069] of the published patent application disclose such details.

New Claim 32 depends from Claim 1, and specifically defines the surface regenerator as comprising at least one of:

(a) a nozzle configured to direct a stream of high velocity air towards the regenerable collection surface to dislodge particles deposited thereon;

(b) a blade configured to scrape the regenerable collection surface to dislodge particles deposited thereon;

(c) means for electrostatically charging the regenerable collection surface, so that a static charge disperses the particles that were deposited thereon;

(d) means for directing energy to the particles collected upon the regenerable collection surface to dislodge particles deposited thereon; and

(e) means for directing energy to the regenerable collection surface to dislodge particles deposited thereon.

The cited art does not teach or suggest such a configuration. FIGURE 2 and the related text on page 7, paragraphs [0068]-[0069] of the published patent application disclose such details.

New Claim 33 depends from Claim 1, and specifically recites "*a liquid coating applicator configured to moisten the regenerable collection surface prior to collecting the particles, thereby enhancing a collection efficiency of the regenerable collection surface.*" The cited art does not teach or suggest an equivalent. FIGURE 4 and the related text on page 7, paragraphs [0070]-[0073] of the published patent application disclose such details.

New Claim 34 depends from Claim 1, and specifically recites "*a mechanical homing sensor that positions the regenerable collection surface relative to at least one additional component.*" The cited art does not teach or suggest an equivalent. FIGURE 2 and the related text on page 7, paragraphs [0074]-[0075] of the published patent application disclose such details.

New Claim 35 depends from Claim 1, and specifically recites "*a processor configured to implement at least one function selected from the group consisting essentially of:*

(a) producing an alarm signal if the detector indicates that the particles collected on the regenerable collection surface are potentially harmful to biological organisms; and

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(b) activating at least one additional component if the detector indicates that the particles collected on the regenerable collection surface are potentially harmful."

The cited art does not teach or suggest an equivalent. FIGURE 9 and the related text on page 14, paragraph [0141], and page 13, paragraphs [0132]-[0134] of the published patent application disclose such details.

New Claim 36 depends from Claim 1, and specifically recites "*a processor coupled to the detector, the processor being logically configured to implement at least one function selected from the group consisting essentially of:*

(a) determine a concentration of biological particles collected on the regenerable collection surface, and to activate an air sampler to obtain a sample of biological particles from the same general area that provided the biological particles originally deposited on the regenerable collection surface;

(b) activating an air sampler to obtain a sample of biological particles from the same general area that provided the biological particles originally deposited on the regenerable collection surface, if the detector indicates that the particles collected on the regenerable collection surface are potentially harmful to biological organisms;

(c) determine a concentration of biological particles collected on the regenerable collection surface, and to activate an analysis device to collect and analyze a sample of biological particles from the same general area that provided the biological particles originally deposited on the regenerable collection surface; and

(d) activating an air analysis device to obtain and analyze a sample of biological particles from the same general area that provided the biological particles originally deposited on the regenerable collection surface, if the detector indicates that the particles collected on the regenerable collection surface are potentially harmful to biological organisms."

The cited art does not teach or suggest an equivalent. FIGURES 6 and 9, and the related text on page 12, paragraphs [0121]-[0123], and page 13, paragraphs [0132]-[0134] of the published patent application disclose such details.

New Claim 37 depends from Claim 21, and specifically recites the additional steps of:

(a) comparing the concentration of immobilized airborne biological particles against predetermined criteria indicative of a potential alarm condition; and

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(b) if the concentration of immobilized airborne biological particles equals or exceeds the predetermined criteria, responding by implementing at least one step selected from the group of steps consisting essentially of:

(i) activating an alarm signal directed to alert a designated party;

(ii) actuating an air management component;

(iv) producing a warning signal;

(iv) activating an air sampler to collect a sample of particles from the same general area that provided the airborne particles deposited on the regenerable collection surface; and

(v) moving a damper in an air duct.

The cited art does not teach or suggest equivalent steps. FIGURES 6 and 9, and the related text on page 12, paragraphs [0121]-[0123], and page 13, paragraphs [0132]-[0134] of the published patent application disclose such details.

New Claim 38 depends from Claim 21, and specifically defines that the step of regenerating the collection surface comprises at least one of the following steps:

(a) brushing the regenerable collection surface, to dislodge the particles deposited on the regenerable collection surface;

(b) pressing a pad against the regenerable collection surface while there is relative motion between the pad and the regenerable collection surface, to remove the particles deposited on the regenerable collection surface;

(c) pressing a wheel against the regenerable collection surface while there is relative motion between the wheel and the regenerable collection surface, to remove the particles deposited on the regenerable collection surface;

(d) directing a stream of high velocity air towards the regenerable collection surface to dislodge the particles deposited on the regenerable collection surface;

(e) electrostatically charging the regenerable collection surface to electrostatically disperse the particles deposited on the regenerable collection surface; and

(f) directing energy to the particles collected upon the regenerable collection surface to dislodge the particles deposited on the regenerable collection surface.

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The cited art does not teach or suggest equivalent steps. FIGURE 2 and the related text on page 7, paragraphs [0068]-[0069] of the published patent application disclose such details.

New Claim 39 depends from Claim 25, and specifically defines that the step of regenerating the collection surface comprises at least one of the following steps:

(a) brushing the regenerable collection surface, to dislodge the particles deposited on the regenerable collection surface;

(b) pressing a pad against the regenerable collection surface while there is relative motion between the pad and the regenerable collection surface, to remove the particles deposited on the regenerable collection surface;

(c) pressing a wheel against the regenerable collection surface while there is relative motion between the wheel and the regenerable collection surface, to remove the particles deposited on the regenerable collection surface;

(d) directing a stream of high velocity air towards the regenerable collection surface to dislodge the particles deposited on the regenerable collection surface;

(e) electrostatically charging the regenerable collection surface to electrostatically disperse the particles deposited on the regenerable collection surface; and

(f) directing energy to the particles collected upon the regenerable collection surface to dislodge the particles deposited on the regenerable collection surface.

The cited art does not teach or suggest equivalent steps. FIGURE 2 and the related text on page 7, paragraphs [0068]-[0069] of the published patent application disclose such details.

New Claim 40 depends from Claim 8, and further recites that the device comprises a particle counter. The text on page 11, paragraph [0112] of the published patent application discusses the use of particle counters. The cited art does not teach or suggest an equivalent device.

New Claim 41 depends from Claim 40, and further recites that the particle counter can distinguish particles based on size. The text on page 11, paragraph [0112] of the published patent application discloses this feature. The cited art does not teach or suggest an equivalent device.

New Claim 42 depends from Claim 12, and further recites that the additional component is either a sampler or analyzer which is located adjacent to the device collecting the original sample. FIGURE 9 and the related text on page 13, paragraphs [0132]-[0134] of the published patent application disclose such details. Paragraph [0132] in particular notes the additional components can

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be located near (i.e., adjacent to) the original sensor (i.e., the claimed device). The cited art does not teach or suggest an equivalent device.

New Claim 43 depends from Claim 1, and further recites that the device comprises a particle counter. The text on page 11, paragraph [0112] of the published patent application discusses the use of particle counters. The cited art does not teach or suggest an equivalent device.

New Claim 44 depends from Claim 43, and further recites that the particle counter can distinguish particles based on size. The text on page 11, paragraph [0112] of the published patent application discloses this feature. The cited art does not teach or suggest an equivalent device.

New Claim 45 depends from Claim 35, and further recites that the additional component is either a sampler or analyzer which is located adjacent to the device collecting the original sample. FIGURE 9 and the related text on page 13, paragraphs [0132]-[0134] of the published patent application disclose such details. Paragraph [0132] in particular notes the additional components can be located near (i.e., adjacent to) the original sensor (i.e., the claimed device). The cited art does not teach or suggest an equivalent device.

Accordingly, all of the claims now submitted define patentable subject matter that is neither anticipated nor obvious in view of the prior art cited. The Examiner is thus requested to pass the present patent application to issue in view of the amendments and the remarks submitted above. If there are any questions that might be addressed by a telephone interview, the Examiner is invited to telephone the undersigned attorney, at the number listed below.

Respectfully submitted,

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